

DRAGON USER

International edition

The independent Dragon magazine

60p US\$2.60 September 1983

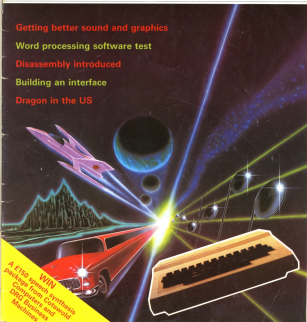
Getting better sound and graphics

Word processing software test

Disassembly introduced

Building an interface

Dragon in the US

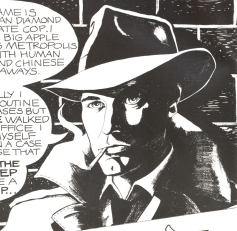


WIN

A £150 speech synthesis
package from Cotswold
Computers and
DRG Business
Machines

MY NAME IS
DIAMOND. DAN DIAMOND
I'M A PRIVATE COP. I
WORK THE BIG APPLE
A SEETHING METROPOLIS
FILLED WITH HUMAN
MISERY AND CHINESE
TAKEAWAYS.

NORMALLY I
ONLY DO ROUTINE
DIVORCE CASES BUT
WHEN **SHE** WALKED
INTO MY OFFICE I
FOUND MYSELF
INVOLVED IN A CASE
SO STRANGE THAT
IT MADE THE
BIG SLEEP
LOOK LIKE A
CAT NAP.



HUNT WINS GRAND PRIZE

At yesterday's Monaco Grand Prix, a hunting party stayed on the track in the climax of the race. Cars were halted as the hounds rampaged around the circuit. "The whole place has gone to the dogs," one driver was reported as saying. The race was restarted, twice around the course before the Hunt triumphed, just the finishing line to take the chequered flag (it hasn't been seen since).

PLAYER WINS OPEN

Eagle-eyed spectators were privileged to see the... some a leading... triumph.



Salamander SOFTWARE

17 NEWBURN ROAD, HODDERSFIELD, OX10 9BA, OXFORDSHIRE

PRIVATE DETECTIVE DISAPPEARS

Police are baffled by the disappearance of Dan Diamond. He was last seen approaching the creek edifice known as Franklin's Tomb, but the authorities are completely unable to find any trace of him. Citizens are asked to report any information relating to his disappearance immediately. For further details, buy FRANKLIN'S report, or information given for the DRAGON 32 and TOMB, a new adventure game for the DRAGON 32 and 386 CPC-1. This adventure comes complete with a 24-page illustrated Case File, 80 on-line illustrated SPECTRUM COMBOTS, SPECTRUM COMBOTS FOR ALL, WEB-CHORES and all other paragon's... Don't

BANANA DICTATOR SLIPS UP

EVEREST TRAGEDY

The Everest Expedition ended in tragedy yesterday as Carl and Fred plunged down a crevasse to a grisly death. Thank the expedition leader was spotted as saying "Fate" *Continued on page*

COLD WAR ON NARG ESCALAT

Thousands dead in hot zones. Madman the Mad and yesterday

DRAGON USER



September 1983

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How to submit articles

The quality of the material we can publish in Dragon User each month will, in a very great extent, depend on the quality of the discoveries that you can make with your Dragon. The Dragon 32 computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Every one who uses a Dragon will be able to discover new tricks and quarts almost every day. The help within Dragon users leads up with the speed of the development work of an most assume that we made the discovery first — that means writing it down and passing it on to others.

Articles which are submitted to Dragon User for publication should not be more than 2000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article to program, as please have a copy. If you want to have your program returned you must include a stamped, addressed envelope.

We pay for articles according to the length and the quality — it is worth making that extra bit of effort.

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Using the USB command, more on input/output, advice on saving and loading a graphics (eg. Microline) saved and a plea for the handicapped

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Learn how to make the most of the Dragon's graphics with this excerpt from Keith and Steven Blair's latest book which covers animation and sound on the Dragon

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An introduction to the advantages of disassembly complete with a comprehensive listing

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Build an interface and link your Dragon to the world outside — diagrams and all details are included

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Six pages of readers' programs: Sketching, Squash, Pontoon and 'Fantasy

Dragon Answers

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This month Cathy offers advice on the Dragon's speed-up POKE, changing crystals and auto-running

Competition Corner

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Your chance to win a speech synthesis package from DRG Business Machines and Cotswold Computers

Editorial

THE ARRIVAL THIS SUMMER of Dragon Data's disk drive system and Sinclair's Microdrive brought an end to one of the longest and slowest races in home computing, if you had held your breath waiting for the arrival of either then you would not have been around to see them cross the finishing line — long ago you would have been carried away prostrate and red-faced, perhaps only breaking silence at the end to mutter about "coming soon" being the more industry's equivalent to "free drinks tomorrow".

Many users, who did not have to be carried away had also lost interest in this marathon race long ago. Doubtless their interest will be revived by the actual arrival of the systems, although the Microdrive is not available in the shops yet. But the time it has taken two of the UK's biggest home computer manufacturers to make good their promises raises questions about their abilities to keep to schedule. The American side of the US Dragon venture is already promising advanced operating systems and this year while the UK waits, less than patiently in many instances, for 64K of "official" memory, the Dragon 32 was not announced until it was ready. Doubtless Dragon Data wishes it had done the same for its drives — so don't interpret silence from the company as indicating a lack of activity, it's only that reticence may now be the preferred policy.

At least the wait is providing chances to smaller companies offering memory upgrades and disk drive systems. Premier Microsystems, in particular, has profited from the delays at Dragon Data — not just in terms of money but in reputation as well. The sound of arcade games in use could not drown the laughter coming from that company's stand at the London Computer Fair earlier this year. The "joke" was Dragon Data continuing to struggle with a problem on its drives which Premier had long ago solved. Many users find it harder to detect the furore in the situation, and it is unlikely that the belated arrival of the "official" memory systems will erase the memory of the long spent waiting.

■ WHEN YOU CAN'T TALK across the office without hanging your arms or legs against Dragons, peripherals or software waiting for review there's only one solution — not amputation but new offices. Dragon User has moved to 12/13 Little Newport Street, London WC2R 3LD. The phone numbers printed elsewhere on this page are now the correct ones on which to call us.

Handicap plea

Dear Sir, The pages at your magazine I would like to contact other (Dragon) users with handicapped children.

Having seen quite very good software suitable for (BBC) to children on a BBC B computer it comes to me the Dragon can do just as well.

I have started writing some very simple programs for my 10-year-old mentally handicapped son — and I am sure there must be a Dragon center somewhere with more knowledge of programming than I.

Bryony Glass,
Rushbury,
Wilt.

Millipede change

I USED to use the Millipede program written by Keith Macdonald in your June issue. On running the program I found that an improvement would be to pause after the message "You ate a frog pellet, you are dead".

My suggested amendment is to line 350, before GOTO 140 insert FOR N=1 TO 1000 NEXT N giving you enough time to read the caption.

Jim Thompson,
Foreley,
Sussex.

Killing a bug

On THE June issue in the article concerning the Dragon and the Tandy Color Computer II/III there is a bug in the Dragon ROM which stops you from using USR machine code calls properly and that you have to redefine each address before calling it.

In fact you can use the USR function normally provided you make your USR call two digits, eg 85, 84.

Some examples:
10 DEFUS80 = 32768:
DEFUS87 = 32768:
DEFUS90 = 32769
20 A = USR(80)
30 B = USR(87)
40 C = USR(84)

I hope you find this useful as it makes using machine code

easier and provided you put the 'B' in front of the digit if greater than zero the correct call is made. But don't put a '0' in front when defining the address or you'll get the dreaded S/E error.

Robert Whitehead,
Birmingham

Getting it right

THE ARTICLE "Getting to grips with Dragon input and output" in your July issue contained a number of errors. Perhaps the following will go some way to help people who have been misled by it:

- (1) The triggering of the cassette relay is not related to any inter-upt handling.
- (2) There is no such thing as a "printer relay" in the Dragon; the G of address PR1 is in fact the printer "acknowledge" input line, and although not handled by the Dragon operating system, it can be used by other software.
- (3) GPR-B of PMA-D is always configured as output. Flipping of the keyboard is achieved by outputting column selection data via PR2 and then reading the returned row data via PR3.
- (4) The value of the joystick comparator is not as simple as suggested; it is in fact represents the result of the comparison between the current value that has been output to the G-A converter, and the value given by the joystick reading that is currently selected via the MENU MENU selection is determined by signals output on the C-A and C-B lines from PMA-G. This also determines which sound source will be directed to the TX.

M J Kemp,
donist
East Sussex

Pal for Dragon

I AM a shade surprised that your July review of printers failed to mention one low-priced machine that works well with the Dragon, the Marlinjet 80.

The current cost is about £230 including VAT and though it has limitations it has much to recommend it.

The great advantages are that it is a sturdy, modernised machine with a high reputation for reliability. Once set up properly it carries on without giving trouble. It is capable of three sizes of print (set via PR1A) — 2, 4/8/16/25, 30 & 24, though as the print head has only six hammers it has no descenders. There are machines with better type, but it is quite legible.

The paper may be fed with either roller or tractor feed — it works equally well with either. And it is possible to get an addition which allows for cassette tape-to-tape to be used — for labels and the like.

Martin Bennett,
London W1.

Saving solution 1...

A LDR RAM is experiencing the same problems I had trying to save and load programs with the Dragon 32.

Using a Ferguson T107 recorder I found that having saved a program the volume control had no tolerance in its setting when reloading.

This problem was eventually solved when I changed the plug on the save lead and saved via the plug-in DIN socket rather than the microphone socket. Connect

signal to pins 1 and 4 and screen to pin 2.

I can only assume that the output from the Dragon, while saving, was overloading the microphone input stage of the recorder.

Alan Bentley,
Boscombe,
Ludlow,
Shrops.

... and 2

I ALSO have had problems in saving programs from the Dragon 32.

The output from the Dragon is high and the auxiliary input of the recorder must be used, not the input. Even if the auxiliary input is used the high level can cause a drop in level during the first few bytes of header producing an I/O error.

The problem is the auto record level on some recorders, which overcomes protecting this effect.

I overcome this problem by fitting a 180K ohm potentiometer between the Dragon and the recorder, and adjusting the level until the recorder input is just below the operating level of the auto record level circuit. Some trial and error is required to obtain the correct level, but once set perfect saving of programs results every time.

Mark Gennett,
Thornham Clavely,
Buckingham,
Lancs.

Graphics hint

THE DRAGON uses memory locations 1508 to 1587 which ends on page 8 of the memory location. By using POKE 86, G, in the program, you can get in mode 3 or 1, 255 different size graphic blocks. This also allows you to use more than the set of four colours, in other modes stated. This will help users to overcome the poor graphic set in text mode.

10 P=C/L/S
20 P=MODE:1:SCREEN:1:1
30 M=1508:G=1
40 POKE M,G
50 G=G+1:IF G=8+1
60 IF G=255:G=0
70 GO TO 40

Mark Gennett,
Thornham Clavely,
Lancs.

Software Top 10

1 (—) Mountain	Dragon Data
2 (—) Basic Tutorial	AmigaSoft
3 (—) Personal Finance	Dragon Data
4 (—) Special Collection 1	Dragon Data
5 (1) The King	Microdeal
6 (2) Space War	Microdeal
7 (—) Android Attack	Microdeal
8 (2) Nightflight	Salamanca
9 (—) Planet Invasion	Microdeal
10 (7) Caterpillar Attack	Microdeal

Chart compiled by Boots

Dragon Dungeon



DRAGON USERS CLUB

Why is the User Club at the Dungeon the biggest in existence, with members in 28 countries?

Is it the fact that "Dragon's Lair" — the club's monthly magazine, is packed with news, information and advice? Or is it the fact that members easily save their subscriptions at just a few of the special membership offers?

Last month a number of UK members saved £23.50 on the purchase of a GIP 108A printer and cable and any member can save up to £36 on annual software purchases.

Join your fellow enthusiasts from Los Angeles to Kuala Lumpur and reap the listed "gifts" on the £22.



DRAGON STICKS

If you want the latest switch-type, self-centring joysticks (best for the spritew, left-right arcade games), we've got them at £19.95 per pair.

If you want the famous "QuickShot" analog-type sticks (no expensive adapter required), we've got them at £19.95 each.

But if you want the ultimate analogue sticks, with the best fire button available, then you have to get DD Dragonsticks (£19.95 per pair). Quotes from satisfied customers:

"Already my top score on 'Shoot Attack' has almost doubled!" — Dr H. P. D.

"Much better than my previous joystick!" — Mr J. M.
"My other analogue sticks seem crude by comparison!" — Miss A. T.

LATEST DRAGON SOFTWARE

THE CRYSTAL CHALICE £1.95

Mike Menzies's epic adventure, set in the distant Kingdom of Darnen. As an apprentice Adventurer of the Sacred Order you must set out on an odyssey to locate the six shards of the shattered chalice, scattered in the four corners of the Kingdom by the evil Black.

If you want an in-depth scenario, a massive command vocabulary and are tired of adventures involving random elements, set out through Tarnhelmwood and head for the Holy Promises and Black's doom! But, while some foes may be laid low by brute force and cool steel, others must be overcome by stealth and witting.

TREASURE TOMB £7.95

Although the castle on Castlebury Mount has long crumbled, the 90-chamber dungeon complex below remains. Before his death, Arthur's master wizard scattered his treasure throughout the complex, but captured up 48 members of his dragon guards to guard the hoard. Phantoms, Vampires, Gorgs, Warlocks, Wizards and many others, roam the chambers, dedicated to let foolishly intruders.

The year is 1585 and a party of Romans, digging to improve the mine, have unearthed the collapsed passageway which leads to the entrance hall of Master's Tomb. Struggling on your heels, removed for digging, you capture through the perilous of doors and find yourself in a room where only the last glimmer of daylight penetrates.

Sort out your courage and prepare to explore. (A real-time, graphics adventure by Mike Menzies.)

MATHS-TRON £5.95

Tests six branches of mathematics (perimeter) at 16 different difficulty levels via a Star Trek graphics game. To bring the "Enterprise" through the Black Holes, Meteoroids and Klingon Gunships, mathematical skill must be demonstrated.

Schools-tested and highly recommended by both primary and early secondary level teachers.

TEMPLE OF ZORIN

An EP adventure by Mike Menzies

Zoran Severely placed it as a suicide mission — and then chose you! Now, after fighting your way through the Zoran guardships, out of fuel and with a damaged transporter, your survival prospects look even dimmer. With Queen Padlock and Secret Police rigging the outside capital even penetrating the Pingwall will be hard enough. Only Agent 8008 would stand a chance, but with the shipboard Reanimation Unit on the blink, even your survival looks questionable. So, get your teeth, fill the robot and prepare for the mission that could end the Romans!

*Joysticks not required £7.95

JUNIOR DRAGON SERIES — CLAY'S CASTLE

An adventure by Mike Menzies

Somewhere within the castle a fair maiden has been imprisoned by the wicked giant. As you brave enough to explore the halls and dungeons to rescue her? To claim a hero's reward you'll have to prove yourself smarter than the creatures who guard her!

*Joysticks not required £5.95

JUNIOR DRAGON SERIES — MILES MADE

An exploration by Mike Menzies

All that glitters in the Males' Maze is not gold! With Magic Holes to fall in and a Devil's Kitchen full of Phosphor Pies to contend with, you may not find the silver route called. You may even be teleported!

*Joysticks not required £5.95

PO. Box 4, Ashbourne, Derbyshire, DE6 1AQ. Tel: (0335) 44626

Moscow calling all Dragons

A **SUSSEX** firm has good news for any Dragon owners who are amateur radio enthusiasts — or who just fancy listening to the Russian news service.

M Kerry's RTTY program enables the Dragon to send and receive radio teleprinter signals used by radio amateurs and many commercial news sources, including

the Russian news agency Tass.

This program is capable of decoding RTTY signals from audio tapes which are fed from an extension speaker port on a user's shortwave or VHF receiver straight into the Dragon's cassette input.

Alternatively, the program can be supplied in a ROM cartridge which plugs into the expansion socket on the Dragon. This costs £21 and has space for a second set of EPROMs. The cassette version costs £12.

M Kerry can be reached at 22 Grosvenor Road, Seaford, Sussex.

Tandy converter comes on cassette

EASIER MONITORING of machine code and conversion of Tandy Colour Computer programs are promised by two new packages.

The latest machine code monitor is from RayJay Electronic Services which normally

covers hardware and industrial electronics, including a disassembler. Demco costs £16.95. RayJay is on (0483) 657056.

Ekan Electronics thinks that its Dragon Cruncher is the first cassette-based, menu-driven program for converting Tandy Colour Computer programs for use on the Dragon. It costs £7.95.

Dragon Cruncher converts most programs and Ekan is working on a machine code converter for the rest. The company is on (041) 756 7012.

Memory added to business system

THE HUMBLE Dragon 32, plus 12K of memory, is ready for the world of business computing, as part of a new accounting system designed for the independent retailer by Haisat Retail Systems.

The Haisat Retailer, as the system is called, incorporates a Dragon 32 (specially modified to 8K), a screen, a cassette monitor and a printer in one unit.

The use of a home computer like the Dragon in the system is an attempt to simplify small business computing.

Says Peter Selby of Haisat: "We wanted to provide a complete unit which can be simply plugged in and operated without the user needing an engineering degree to darned all the bits together."

Programs for the system, which come in cartridge form, provide the retailer with what is claimed to be a quick and

easy way to do the book-keeping. They can provide information for profitability analysis, stock investment, expense analysis and bank account and supplier account records. VAT returns are produced automatically.

DRAGON OWNERS who want to add a joystick to their computer also have more choices to choose from.

American company Spectrum Projects is aiming at those users who wish to share their computer games with a friend. It is marketing a double stick interface which allows you to hook-up two Atari-type joysticks for use on your Dragon.

The interface by itself will cost UK residents £155.95. Or, for £154.95, you can get

Bid Horace and Atari welcome

ATARI AND Melbourne House's Horace are entering the Dragon software market while already established Wintertsoft is extending its range.

Micro manufacturer Atari, whose best-selling games include the original Pacman and Centipede, is converting its software to run on the Dragon.

Melbourne House is doing the same for Horace and Wintertsoft is continuing its saga of the Ring of Dwarves.

Horace moves over from the Spectrum this month. Hungry Horace is the first conversion, available at £5.95. Horace goes Ski-ing and Horace and the Spiders follow next month at the same price.

Once the Dragon 64 is available, The Horace may also be concerned. At the moment memory restrictions are the problem.

Melbourne House is on 01-877 8163.

In addition to its follow-up to the Ring, Wintertsoft is also releasing an arcade adventure entitled Operation Greenin. In this a player controls eight different characters (Captain Bero and his crack squad) in a bid to save an evacuated space city.

Wintertsoft has moved recently — to Uplands Park Road, Enfield, Middlesex. Its new telephone number is 01-367 5720.



Wintertsoft's Dave Brotham and John Humphreys - adding to the Ring

Joystick choice widens

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The interface by itself will cost UK residents £155.95. Or, for £154.95, you can get

the interface with two Atari joysticks. Orders should be sent to Spectrum Projects, 60-15 88th Drive, Woodhaven, New York 11421.

Close to home, Manchester-based Ekan Electronics has what can be described as a "deluxe" joystick on the market.

Called the Quickshot, Ekan's joystick boasts a handle contoured to fit the shape of the hand, two firing buttons (a "deluxe" button on top of the stick and a "conver-

sional" button on the base), and a rubber action cup on the bottom to give added stability for one-handed operation.

It also has a four-foot long cord and can plug straight into the Dragon 32 or a Tandy Colour Computer.

The Quickshot sells at £14.95 plus £1 post and packing or you can get a pair for £28.95 plus £1.50 post and packing. Ekan Electronics can be contacted on (061) 756 7812.



Now you can hookup two
Atari® type digital joysticks
to your DRAGON32 or Tandy

Colour Computer for
true competition feel
and action with the

DOUBLE DOUBLE STICK® INTERFACE

for only \$29.95.
(£19.95)



ALL PRICES IN U.S. DOLLARS AND
INCLUDE POST/PACKING AND INSURANCE.

\$49.95 - The interface with
two Atari® joysticks



•Interface made by WICO. Atari is
a registered trademark of Atari, Inc.

YES!

Please send :

- ☐ 1 INTERFACEs... \$29.95
- ☐ 1 STICK/INTERFACE SETs... \$49.95

I enclose a Postal Order in US funds for \$.....

NAME _____

ADDRESS _____

POST CODE _____

SPECTRUM PROJECTS

80-15 86th DRIVE • WOODHAVEN, NY 11421 USA

Datapen promises control

A NEW light-pen claimed to give the operator greater control over data capture is now available for the Dragon 32.

The light-pen, which is being manufactured by the newly-formed Datapen Microtechnology, costs £25.

Datapen's sales director, Pam Payne, feels the pen is superior to others on the market.

"Most light-pens on the market are difficult to use because the operator has little or no control over the pen's data capture as the pen approaches the screen," she said. "Our lightpen has a LED readout showing that data is available and a switch built into the casing that allows the operator to signal when the position is right."

Datapen is including a range of software with each light-pen. In addition to user routines and example programs there is also a freestanding drawing program.

Datapen can be contacted on (0204) 770466.



Datapen's light-pen - with LED readout and built-in switch

Software firms hit hitches with Dragon Data

TWO SOFTWARE houses disappointed by negotiations with Dragon Data are warning others not to let their hopes rise too high.

Dragon Data discussed the possibility of marketing software from the two firms, Winrush Micro Systems and MST Consultants, but eventually decided against it.

The time Dragon Data took to reach this decision has not impressed either software house. Both also argue that they were given a more optimistic impression by the actual negotiations.

Dragon Data argues that these two cases are exceptions, being the only negotiations which looked favourable but did not turn out so in the end.

In other cases, the company says, negotiations have ended

favourably for the software houses involved and their products.

Peter Crane, of Devon-based MST which produces business software, says that he felt deflated, "having been taken to the top of a high mountain and shown the world".

His regret is that while negotiating with Dragon Data he stopped pursuing other outlets for his products.

Peter's talks with Dragon Data spread over three months, while Winrush's, centring on its Macra vector assembler/monitor, took two months longer.

Winrush's Bill Dickinson cut back promotion of Macra during negotiations. He now thinks "the answer is to carry on marketing until you've got a signed contract".

SOFTEK

The Ultimate in Dragon 32 Software

MONSTERS!

£6.95 inc

Why did I offer? It sounded crazy from the start. Go to Zol III, they said, find the power modules hidden within the planet's mines. But look out, they warned, the mines are guarded by Zolastrom Monster Robots. They made it sound so easy, but when I got there...

100% machine code action with smooth hi-res graphics and superb sounds. This game is a must for every Dragon owner. Loosely based on the arcade game 'Panic', but more, much more.



SOFTEK SOFTWARE 329 Croxted Road London SE24

AVAILABLE
NOW

DRAGON 32 OWNERS

AVAILABLE
NOW

Now you can buy a professional disk system to turn your Dragon into a real computer!

DELTA DISC SYSTEM

THE DELTA DISK SYSTEM gives you —

- An affordable disk system.
- Powerful DELTA disk commands — see right.
- Random, Sequential and Indexed file-handling.
- Simple plug-in to DRAGON — unlike other systems there are NO HARDWARE ADDS needed to run DELTA.
- Easily expandable 100K to 1.4 megabyte storage.
- Full range of features, utility and games software close to release.
- The price you see is the price you pay — NO HIDDEN RAM upgrade costs.
- Less than 2K of user-RAM as DELTA is built in EPROM.



DELTA contains the following powerful ten words, all directly from BASIC:

SAVE*	APPEND	LIST*
LOAD*	DIR*	RMV*
CHAIN*	APPEND*	DEL
PRE	CONF*	ALL
APPEND	VERIFY*	SELECT
COPY*	BACKUP*	CREATE
FLUSH	OPEN	CLOSE
FILES	END*	RENAME*
DISK*	BOOT*	INPUT
POINT	PAUSE	PAUSE
GO		IF ERROR THEN

DELTA CARTRIDGE — contains DELTA Disk Operating System, User Manual, demonstration software. **£99.95**

DELTA 1 — DELTA Cartridge, User Manual, a single-sided 90 track (100K) drive plus free cable. **£299.95**

DELTA 2 — as DELTA 1, but with a double-sided (200K) drive. **£399.95**

Disk Interface cable supplied free with DELTA 1 or 2. **£10.00**

ENCODER EP assembler/disassembler/Editor — integral with DELTA. **£19.95**

INFOEM — Data Base Management System customised especially for DELTA systems. **£39.95**

SCREEN — free level editor on DRAGON

Below is a live 'screen dump' generated by our **HEPRINT** program. It clearly shows the features and display potential of **SCREEN**:

HEPRINT/HEPRINT/HEPRINT

- Line 0000: 0000 type text cursor for the keyboard
- At address 01: a 24 screen display which gives a screen (00000) 0000
- Full text display on every screen
- Summary: 00000000 00000000
- Go to 255 user-defined program
- Press any keyboard action command to view help information
- Shift on while text display action
- Press 0000 command returning to 0000 from screen display (screen) 0000

Cartridge £19.95 **DELTA disk £19.95**

ENCODER EP — is a full symbolic assembler using standard mnemonics and pseudo op-codes. Source code can be incorporated into BASIC programs. The monitor version contains commands to allow memory display, modification and navigation. Memory block move, breakpoint handling, full disassembly and a full editor are only a few of its many features. The most powerful assembler/disassembler/Editor available for the DRAGON 32. Available in either an integral DELTA format or as cassette.

Type **LIST/5Disk** — see above

HEPRINT — screen dumper

— will dump the entire contents of your DRAGON 32 high-res screen to a high resolution printer. Can be used for design, display etc. later info. Available at present for EPSON printers only. Other modules to follow shortly.

Type **£19.95** **DELTA disk £19.95**

PORTAL and TRACKING
Software Xp, DELTA systems (1.4K).
ALL PRICES INCLUDE VAT.
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Packages focus on the hi-res screen

DRAGON OWNERS can now put text on to the high-resolution screen, and then dump the contents to a printer using another package.

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datasette. ASCII is an 81-841 1807.

The high-resolution screen dump program comes from *Coweman Computers* in Gateshead.

Another cassette, it costs £7.95 and needs a Tandy DMP 180 or Seikosha DP100 A printer.

Coweman Computers is at 55 Iona Road, Windy Nook, Gateshead, Tyne and Wear.

Cover-up begins for the Dragon

THE LATEST addition to the list of extras owners can buy for their Dragon is the computer cover. And already several companies have different versions on the market — ranging from simple dust covers to a carry case to protect the Dragon from being knocked.

Janet Trading is producing a carry and storage case specially designed for the Dragon 32.

The case is waterproof and made of heavy duty brown vinyl. To give extra protection to the Dragon it is lined and has reinforced edges. It can also hold the transformer and leads.

The case is normally priced at £70.95, but Janet has an introductory offer of £3.95, providing the order is received by the end of October. Orders can be sent to Janet Trading, 19 Spire Lane, Droppa Mynnis, South Milton, Devon PL36 9NY.

For those who feel their Dragons need protection only from the dust there are also lightweight covers on the market. *Compuhouse* and *Compuworld Computers* are both producing plastic dust covers for the Dragon.

The *Compuhouse* version is light blue with a dark blue trim. Readers can order one by sending £2.95 to Compuhouse, 2660 Green Lane, Palmers Green, London H13 9QA.

The company is also giving away one free cover with software orders over £25, but this offer only lasts until the end of October.

Compuworld Computers makes a similar dust cover, except that it's beige with a brown trim and has the word Dragon printed on it. It costs £3.50.

Compuworld Computers can be contacted on (0606) 737472.

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DEALER ENQUIRIES
WELCOME

Dragon Data offers a forum for users

This month we clear up a few questions surrounding the biggest Dragon club.

THE BIGGEST DRAGON Club, both in terms of members and published letters we receive, is the one set up by the machine's manufacturer, Dragon Data.

One aim of the Dragon Users' Club is to help users form local clubs and pass on news of existing groups through its newsletter *Stop Press*, which is mailed out free to all members of the club. To receive copies of this newsletter all you have to do is fill in and return the warranty card which came with your Dragon. But Dragon Data points out that a lot of people have not so far registered in this way. The company adds: "If you know of anybody in this category, gently prod them to return their card so that future issues of *Stop Press* may be directed to them."

If you have returned your registration card and not heard anything yet, in the immortal words of the Hitchhiker's Guide to the Galaxy, "don't panic". The mailing list for each issue of *Stop Press* is prepared in advance of publication. This means that if you return your warranty card about the same time as an issue of *Stop Press* is released you will not get on to the mailing list in time to receive that issue. You should, of course, be okay for subsequent issues.

However, if you have still not received anything about eight weeks after returning your card, then write to Dragon Data with



Dragon Data — home of *Stop Press*

details (and proof of purchase if possible) and the company should then check that you are on the mailing list.

As with this magazine, the decision on how many copies to print of each issue is based partly on the number of people registered. This means that back issues of *Stop Press* are very hard to get hold of — so register as quickly as possible to avoid missing the ones to come.

Another thing to do quickly, if you are trying to establish a users' group or have already set one up, is to write to *Stop Press*. Dragon Data wants to publish a complete list of such clubs in *Stop Press*. "In this way we can put other users in your area in touch with your club," it says at the end of this year the company expects to have sold more than 160,000 Dragons. If every

super registers then the likelihood of establishing contact with nearby users will be high indeed.

Dragon Data wants to encourage the growth of such clubs but will not interfere with what users want to do. "Dragon Data does not intend to involve itself directly in the running of local clubs, believing it best left to the enthusiasm of their members." However, if you would like support material for club activities then write to Dragon Data outlining what you have in mind.

But *Stop Press* does a lot more than provide local user clubs. The first issue of the newsletter outlined its aims — "to help keep Dragon users informed of the very latest developments in Dragon technology, including the introduction of new peripherals, the latest on software releases and even the development of new Dragon computers".

Readers are invited to contribute programs, comments, suggestions, hints or stories. Dragon Data itself contributes advice — for example, the first issue of *Stop Press* offers some tips on cassette loading and saving with the Dragon. Two sections introduced in the second issue also appear in the third, Machine Code Corner and the Young User Pages, and Dragon Data hopes these will become regular features.

Many of the letters this magazine receives about the Dragon Users' Club and *Stop Press* have been prompted by the time it took Dragon Data to organise that end of its activities. People who bought their Dragons last year were none too pleased at the long wait before *Stop Press* was published this year. But now the newsletter is up and running, and getting bigger every issue.

Confusion between this magazine, which is an independent publication, and *Stop Press* has also been running high. This has not been helped by the fact that Dragon User is published by Sunshine Books, a trading name of Scott Press, which sounds suspiciously like *Stop Press* over the telephone.

One caller phoned these offices only to be told, in his understandable amazement, that we were not the Dragon Users' Club but that we are indeed Scott Press. To return that reader to sanity, and to reassure any others still perplexed, *Stop Press* can be contacted at Dragon Data, Kewley Industrial Estate, Margate, P.O. Taitor, West Gt. Ouse, York.

Clubnet

Surreyshire: Dragon Owners' Club, Dragon Dungeons, PO Box 4, Andover, Surrey — publishes Dragon's Teeth.

Devon: Ian Chipperfield, Bickham Dragon Owners Club, 22 Brookside Court, Bickham, Devon — meets every Saturday afternoon.

Gloucester: Dragon 32 Users' Club, Games and Computers, 31 North Street, Macclesfield, Devon — publishes newsletter.

Essex: Doug Bourne, Dragon Independent Owners' Association, School House, Newn Road, Rayleigh, Essex — publishes The Dragon's Tale.

Lancashire: Melvin Franklin, North-West 1195-88 Users' Group, 40 Cornhill, Westhoughton, Bolton, Lancs — growing number of Dragon users.

meets monthly at Istan near Manchester and publishes newsletter.

London: 68 Mori Group, 61 Petworth Road, Harrow, Middlesex — publishes 68 Miniature and meets on the fourth Tuesday throughout the year in the Hagel's Park Library, Petworth Street, London NW11, at 68000 owners welcome.

Staffordshire: Tony Beckwith, Time Computer Club, 57 Adonis Close, Tamworth, Staffs — an all-user club including 16 Dragon owners, meets fortnightly.

Wiltshire: R Gould, 39 Culmore Road, Stratton St Margaret, Swindon, Wills — interested in forming Club 32.

Scotland: David Anderson, Scottish Dragon Club, 1 Walker Street, Edinburgh — regular newsletter.

South Africa: Ian McCall invites other SA Dragon writers to contact him at 35 Sirocco Road, Randebosch, Cape Town.

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A look at the serious side of the Dragon

John Scriven takes a break from games to look at the more serious side of the Dragon.

"Why did WE buy that computer, Hersey?"

"So that little Jack and Jill could have a head start in life, dear."

"You mean, pushing them forward on the crest of the micro-technological revolution, so they'll be able to do well at school, and both get good jobs and keep us in our old age?"

"Yes, that's it exactly. Oh, and so that we needn't get left behind in the exciting, thrilling eighties."

"Well then, could you tell me something that's been worrying me?"

"Of course, my dear."

"If all that's true, then why did they spend the first three months after Christmas playing Galactic Super Zap, then lose interest?"

"Um, well . . ."

"And didn't you say your accountant wasn't impressed when you tried to tell him that your Spindacious Adventure cartridge was a justifiable business expense?"

"Um, well . . ."

After owning a computer for a few months, some people find that a constant diet of alien-chomping and avoiding angry gorillas begins to pall somewhat. Others, trapped in extreme misanthropy to man or pursued through ancient mazes long into the dark night, are pleased for any opportunity to escape into the fresh air. There are also those who want to justify the purchase of an expensive piece of equipment, and although the above seems a far-fetched (one hopes!), a computer is so versatile a machine to be restricted to any one use.

This month I have been looking at a selection of more serious uses to which a Dragon can be put. These can be divided into business uses, graphic design and program development. If you run a business yourself, then you are likely to want something rather more powerful than a Dragon to look after stock control, invoicing, etc. If your business is small, however, or you are just a home user, there are times when a word-processing facility would be a great help, if only to store a standard letter off springs to your bank manager.

A word processor (or WP) has to perform several tasks. Going far beyond an electric typewriter, it should be able to accept continuous typing, without the need to include line-feeds and carriage returns. Any words that are too long to appear at the end of one line should automatically be sent to the start of the next (automatic word-wrap). Mistakes, even in the middle of the text, need to be readily accessible for correction. Blocks of text may need to be deleted or moved, and it is a good idea if the text can appear on the screen in its final formatted form, before being printed.

Under review

Teletext £49.95	Microdeal 41 Turg Road St Austell Cornwall
TextEditor £13.95	Personal Software Services 462 Somersham Road Cambridge
Editor £8.95	Microdeal 18 The Oaks Craft Chesham Dorset
Word Processor £11.25	Jupiter Computing 8 Pembroke Green Lea Maldenbury Wilt
Wires £25.20	Compuware PO Box 158 Green Lanes Palmer Green London
Artist's Designers £5.99	Wintanhill 26 Lymington Park Road Enfield, Middlesex
Draw! Draw! £20.45	Compuware PO Box 158 Green Lanes Palmer Green London
Mass £29.95	Wintanhill Micro Systems Worded Laboratories North Wiltshire Rothley

Above all, a word processor needs to be able to store text and save and load it from tape or disk.

Other features that are useful are right justification and proportional spacing, so that the words in each line are spread out to reach both left and right margins (as they do in this magazine). Line length and spacing should be easily altered, and any facilities on the printer such as different type fonts and double height letters should be easy to select.

The Dragon has several features that make it a good machine for word processing, and several that discourage its use in this area. The keyboard is obviously much better than those on computers with calculator style or subset keys. What is less obvious is that the scanning routine is not so up to very rapid key-presses, and odd letters tend to disappear when typed fast.

The Dragon does possess a built-in Centronics interface — the most common standard parallel printer connection — so it is easy to hook it up to the vast majority of printers on the market. This does, however, raise another point — printers that can produce reasonable quality on paper approximately A4 in size start at £200, which has to be added to the price of the WP package. There is little point in using such a package unless you can produce decent hard copy.

A further problem that occurs is with the display screen. The Dragon's standard text screen is 32 x 18, which is excellent for readability, but cannot duplicate the final appearance on paper, unless the character set is redefined to at least half its original size. Dedicated WPs have a green display of 80 characters, which corresponds to standard small printer width.

Lastly, of course, although the Dragon supplies the correct upper and lower case codes, to a printer, it cannot produce small letters on the screen.

Packages

If you think I have shot down the Dragon before I have even started to consider the packages on offer, that is not the case. All computers in the sub £200 price bracket have deficiencies, and anyone expecting full professional facilities on one of them is deluding themselves. There are many round some of these deficiencies and some of the packages have succeeded in producing what is a reasonable compromise.

The four packages I have been looking at vary considerably in price, and if you need a word processor, the best thing would be to try out each one to see if it offers exactly what you need.

Teletext, from Microdeal, is the best documented, most comprehensive in terms of printers covered, and, naturally, the most expensive at £49.95. Written originally for the Tandy Colour Computer in the States by Cognitech, it comes as an A4 stiff ring file, containing instructions and a manual. Almost defined by the size of the container is a little packet containing the cassette. This contains several versions of the program with demon- ▶

© Computer COMPUSERVE Ltd 1983 HI-RES 1.1.5

(C) 1983, IMAGE DATA LTD
16K BASIC INTERPRETER 1.0
(C) 1982 BY MICROSOFT

OK
LOSER: H = 1 TO 10
207 JUST A LINE OF TEXT to show what HI-RES can do"

30NEXT

400

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JUST A LINE OF TEXT to show what HI-RES can do
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OK

1

CompuServe's Hi-res — a high resolution screen of 51 by 24, including extended character sets making it easy to mix graphics and text

■ graphic texts. Each is suitable for a different range of printers (the reason for this is that although they may use standard interfaces, printers use different codes to control expanded text, underlining, etc).

To cope with the problem of unsuitable screen format and lack of lower case letters, the screen is restricted to allow 24 rows of 51 characters, and pressing SHIFT 0 gives true lower case on the screen. These letters are surprisingly clear in black on white. In fact, a higher resolution would not be clearly visible on a normal TV, and computers such as the BBC with 80 column modes are only really suited to monitor use when used in the highest resolution. Having 51 characters is just wide enough for word processing. If you want to examine the finished document on screen, but it does tend to produce a skinky letter. Longer lines are possible, but they aren't shown in their true format on the screen.

Typing Imitation

My main imitation with any other high resolution program is common to all the WP packages, and is more to do with the keyboard scan than anything inherently wrong with the programs themselves. Every time I get into a typing rhythm, odd letters were missed out — and although I do a lot of typing, it's hardly done at a great speed.

Text Star and Personal Software Services and Microplot's Editor both have less than 2,000 words documentation, rather than the 50,000 or so with Teletext. This

means you have to experiment for a while to discover the full potential of these programs. In fact, they both bear the trademark Microplot, and were written by the same author. Both programs show a considerable resemblance to each other, even down to the idiosyncratic spelling of "cursor". Even though Editor is supposed to have been written more recently, I certainly don't find it as user-friendly, making less use of menus, etc. Both take some time perusing the limited documentation to become familiar with their operation.

Traditional

Neither of the programs produces lower case characters or attempts to display text in anything but the traditional fashion, but both are capable of formatting a reasonable letter on the screen and printing it. They are equally suitable for editing Basic programs. If you save a Basic program by using SAVE "PRG": A (thus saving it in ASCII format), it can be loaded into all of the programs reviewed so far, and edited on screen, a feature that the Dragon does not usually allow. If you don't own a printer, it would certainly make the programs a worthwhile consideration.

Juniper Computing's word processor is also cassette-based, but makes use of frequent menus to select the options. The documentation is clear and fills somewhere between the length of Microplot and the other two programs. Although it is limited in its options compared to the other programs, it is the easiest to use and

worked well with Microsoft, Seikache and Epson printers.

While the Juniper version is easy to use, like Teletext, it does seem to be slightly over-priced at £17.25. There is little to choose between Text Star and Microplot's WP. These certainly seem to offer the best value. If you need a high resolution mode to examine the final text on the screen, a detailed instruction course and can afford the expensive Microplot package, then you will find versatility, exceptional documentation, and good screen display.

Graphics aids can vary from simple routines that draw designs on the screen up to complex computer aided design packages that will put predefined shapes anywhere on the screen and rotate and enlarge them. The two programs that I have been looking at both fall into the second category, although they work in different ways and achieve different effects.

Extensions

Hi-res from CompuServe comes as a PCdM cartridge. Rather than being simply a program that allows you to draw on the screen, it instead gives you extensions to the Basic drawing commands already available on the Dragon. This is carried out on a high-resolution screen of 51 by 24 (like Teletext), and includes extended character sets so it is easy to mix graphics and text. Provided the program is not too long, it is interesting to test other programs from cassette while Hi-res is plugged in, just to see if there is an improvement in

the screen display. The keyboard has also been re-configured so that extra characters can be accessed from the top row of keys by pressing CLEAR as an extra SHIFT key.

The documentation implies that there are 18 different sets looking inside, and the European and US sets certainly appear as one would imagine, with accents, update-and question marks, umlauts, etc. However, I felt a little cheated when I entered CIL 18 (selects Japanese character set) and discovered not a beautiful new character set, but the usual English set plus a fairly yon symbol — still, that would have been too much to ask!

If you aren't happy with the available characters, you can redefine your own on a four-by-eight matrix quite easily. As you can redefine the whole character set like this, there are over 200 new characters available. The documentation calls these "sprites", but they are not what Atari means, for instance, would call sprites, and they cannot move in pseudo three dimensional space or do any of the usual sprite tricks. In spite of this, they are very useful in their own way as extensions to the usual graphics routines on the Dragon, and if you can afford the standard high cartridge price, then there is no doubt that Hires will add to the pictorial capabilities of your machine.

Advanced

Artel's Designer from Watersoft is basically an advanced version of multi-etch. It can draw lines, circles, boxes, ellipses and spokes, and you can PUT and GET shapes around the screen — in fact you have access to all the drawing commands that are available in Dragon Basic, but also obtainable directly by single key-press, which makes the task very easy. It works in all the drawing modes and each time you need to make a choice, the test screen comes up with an easy-to-understand menu. When you have completed a picture, it can be saved to tape and recalled at a later date. There is also a slide-show option so you can load a series of pictures from tape and display them in turn. If you need all easy way of drawing plans or designs, then this is the ideal program. Watersoft itself uses this program to draw the starting frames in some of its other programs, and some examples are included on the cassette.

There comes a time when the speed and facilities offered by Dragon Basic no longer satisfy the programmer, and he or she wonders if it might not perhaps be worth the effort of learning to program in machine code, or at least to use machine code routines in Basic programs. Accessing the 6809 processor is easy on the Dragon, but simply entering line upon line of meaningless numbers is intimidating and time-consuming, so the first serious purchase after a book on 6809 machine code must of necessity be an assembler, with a disassembler and a machine-code monitor high on the list too.

All processors have instruction sets, a series of commands that tell them how to operate — in a way this is analogous to

Basic keywords. The commands tell the processor to load several registers or temporary stores with various values, and these commands are different for each processor. Some computers, eg Commodore Pros, Vics and 64s, BBCs, Electrons, Apples and Orics, use the Rockwell 6502 families. Lynx, Oscom, etc. use the Zilog Z80 series; but Dragons and the Tandem Colour Computer are the only domestic machines to use the Motorola-6809. This is not because the 6809 is inferior in any way — simply that it came into the market more recently and has been mainly used for industrial and control applications. It has 58 basic op-codes, but these can be expanded in different addressing modes to make 1,404 instructions in all. In a limited way it approaches the power of a 16-bit processor, particularly as it has two 8-bit registers that can be used as one 16-bit accumulator.

Memory label

It would be impossible to remember the function of all the instruction codes, so each one is given a mnemonic, or memory label, eg the instruction ADDA#M1 means "Add Memory to accumulator A" which makes a lot more sense than 44H. The most interesting mnemonic in the 6809 is EXX which means "Exchange register D into A" (used to convert 8-bit numbers into 16-bit numbers). This instruction does not exist in 6802 microcomputers, so it's quite true to say that you can't have EXX with an Apple, but you can with a Dragon!

You could enter the op-codes by hand, but easier than that is to use an assembler

and simply type in the mnemonics. Assemblers are programs that translate the mnemonics (the source programs) into their binary equivalents (the object programs). They can also usually tell you assign names to various locations in memory as well as displaying your program in a neat form on the screen. A disassembler works in reverse, and a monitor editor will allow you to look at a completed program and alter it.

Both Gasm/Demon from Compuserve and Mace from Windrush Micro Systems come in the form of plugin ROM cartridges. They are therefore far easier to set up and do not eat up so much valuable RAM in use, as do tape-based assemblers. The price of the two cartridges is similar.

Gasm, the assembler part of the package, performs its task perfectly well, and the documentation is comprehensive and clearly written. Gasm uses 18 assembler directives (and instructions) to make assembly easier and can assemble to the screen or to a printer and show the resulting program on cassette. There are nine error messages if your source program fails to assemble at the second pass. A problem occurs not when your program is bugged and assembles correctly, but when it fails to do what was intended. You need the monitor part, Demon, with a breakpoint facility to check each section is performing as it should.

Mace

The documentation for Mace is 88 pages long. Apart from general instructions, it gives a detailed breakdown of the 6809 instruction set, use of interrupts, and monitor and editor commands as well as examples. On plugging in, switching on, and entering EXX 4B152, you are in editor mode. This gives you 20 options, including insertion and deletion of program lines, search and replace strings, load and save from tape, edit, assemble, go to system monitor or exit to Basic. There are 15 assembler directives and 14 assembly error messages, and the monitor allows breakpoints and jumps to sub-routines, both vital to final debugging.

If you intend to purchase either cartridge, then it is well to remember that neither of the accompanying booklets attempts to teach you assembly programming. For this, you will need a copy of either Lance Leventhal's 6809 Assembly Language Programming or Rodney Zaki's Programming the 6809. Naturally enough, the articles in Dragon User on machine code programming will prove a useful baptism in this difficult, but useful area.

Those of you that are ardent addicts may feel rather left out this month, but I shall be reporting on your favourite deal again next month, along with any other new software that comes my way. If you feel too left out, you could always spend the next month learning machine code and graphics techniques, then documenting it in a word processing package, finally producing your first high-speed arcade game! ■



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 - Address list under cursor edit
 - Memory and binary representation of byte at cursor
 - Flag search (hex-dec)
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- Flag to show which breakpoint caused last exit
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- Calculation from register address to cursor position
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- Variable program is relocatable
- Some assembler and disassembler facilities

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Headquarters of Tano, the American corporation responsible for the manufacture and distribution of the Dragon 64 in the US

Dragon 64 gets set for the US

The Dragon 64 is due in the US this month — Craig Hanna, vice president of the Los Angeles Colour Computer Users' Group, has the details.

THE RELEASE OF the Dragon 64 in the United States has been in the planning for quite some time, as I learned in a lengthy interview with the director of sales at Tano in New Orleans, Louisiana. George Merchant was more than willing to share information on Tano and the Dragon 64.

Tano is the American corporation responsible for the overall manufacture and distribution of the Dragon 64 in the US. It has been around for 20 years, and has divisions in oil and gasoline, and in maritime as well. Its oil division designs systems to measure flow in oil lines, like the Alaskan pipeline.

Its maritime ventures deal with spares and monitors for large ocean vessels. Tano knows what precise equipment is required in these devices, and

uses that technology in its computer manufacturing as well. "We go through some very exact quality control standards," George says of Tano's production facilities. Dragon/Tano is the joint-venture company involved in the dealings between Tano and Dragon Data in the UK. The Dragon will appear in the US, Canada and Central and South America thanks to Dragon/Tano.

Directors

The directors of the new company are Tony Clarke, Dragon Data's managing director, along with the Welsh firm's marketing director Richard Wadman. Tano's president James Pessa Jr. and Walter Berger Jr., vice president of business operations at Tano.

The Dragon 64 is exactly the same as the UK's version,

with the exception of the power supply and the video output (due to the different specifications in televisions and monitors between the US and the UK). When you open the box to the Dragon 64 you get the computer, a 160 page manual (with highly detailed memory maps), and software — including an electronic spreadsheet, a mail merge program, and a word processing package (Tascwriter 64) for a retail price of \$269.

Software for the Dragon 32 will be available and completely compatible with the 64. Tano will be marketing many of the software packages directly through the dealerships. It is currently looking at approximately 150 different packages for marketing. Tano is licensing software from Dragon Data, while at the same time contacting authors of a

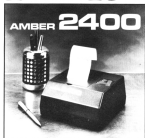
number of Colour Computer programs to see about licensing their products as well.

Software

With the number of companies offering software for the Colour Computer in the US, there will definitely be outside support for software, in addition to what Tano will be offering. The adaptability of machine-language software between the Dragon 64 and the Colour Computer will retain quite a number of programs for immediate use on the Dragon. For business-minded users, the aim is to have an 80 column expansion ready by the end of September at the latest. How does Dynamic sound? Dragon 64 is got it.

With the standard 90 day warranty and trained dealers ready to handle most Dragon repair problems, it seems

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- (5) LISTS (L) - List - String commands
- (6) LISTS (L) - List - String commands
- (7) LISTS (L) - List - String commands
- (8) LISTS (L) - List - String commands
- (9) LISTS (L) - List - String commands
- (10) LISTS (L) - List - String commands
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Proposed expansion at Tanso - two-story administration and training centre due to be completed by the end of this year

■ Some of the most important backing for a computer is being taken care of. So often, a new computer on the market will have no one to repair it once it is broken, aside from sending it to the company to be fixed. Tanso is finishing a contract with Western Union which has 500 repair centres across the country. A Dragon owner can get his computer repaired at any of these places.

The Dragon 64 will sport a cassette player, a disk drive (single and dual), printers (daisywheel and dot-matrix), modems, poyklets, and other peripherals that will be incorporated with the look of the Dragon. These features are also expected to be announced towards the end of September. D50 and Flex will also be available shortly to run on the system. A speech synthesizer will also be ready at the time the Dragon 64 is released. The 64 will also support the same robot arms as are available for the 32.

George describes the Dragon as "the serious, affordable home computer". Tanso wants everyone to know that the Dragon 64 is a "nice" machine that is well made. Marketing will be aimed at the family interested in learning, budgeting, and education. Television and newspaper magazine advertising will be ready soon, and George Menchard says Tanso will be advertising first in the Phoenix, Ar-



Walter Dargatzis, Jr., ...

izona area where the Broadway department store chain will be the dealer for the computer.

With the "shaking out" of the computer industry in the US and the loss of millions of dollars by companies such as Texas Instruments and Alan, George feels that Tanso will be able to compete in the huge market, making the Dragon a serious family machine, not just a video games player.

Sales

Tanso estimates that 250,000 machines will sell in the first year of the Dragon 64's release. Sales of the Dragon will be strictly walk-in. Aimed at department and retail stores in large metropolitan shopping centres, the Dragon will not be sold via mail order. The computer will never appear in "lower-end" depart-



James Fleiss, Jr., president of Tanso

ment store chains, says George. Tanso wants the Dragon to have a good image, and not appear on toy store shelves. It will train all sales people with classes and video to be knowledgeable about the Dragon. Dragon will be selling its computer alone on the shelves, having worked a deal so that the Atari and Commodore will be on the top shelves, and the Dragon will be in the electronics department where a more serious computer purchase can be made.

Retail shops other than the larger department stores will be selling the Dragon 64 next to other systems. Initially, there will be 17 dealers for the Dragon. Another 100 or so will have an evaluation unit to decide if they will sell the Dragon. Businesses interested in becoming dealers

need to fill out an application and provide credit references, as well as tell a bit about their company.

Dragon design will be handled at both Tanso in New Orleans and Dragon in Wales. A new 48,000 square foot building houses the Dragon 64 production lines. Full production on the 64 will begin sometime in October.

And a 128

Tanso and Dragon are working very closely together on the design of many new things to come. The Dragon 128 will be announced in November in the US and will feature a dual processing 68000 microprocessor, a 10 key numeric keypad, with the possibility of C64 compatible upon power-on, and 128K. Tanso will be marketing all the new Dragon systems to be coming out of Dragon Data as well.

Tanso will give the purchaser of the Dragon a subscription to a newsletter, with tips, new product announcements, club information, and a questions and answers section. This is similar to the newsletter currently available to owners from Dragon Data in the UK.

With a release date of August 26, the Dragon 64 will be ready for sale about September 1. It looks as though Tanso is ready for the American market, providing a good machine with readily accessible peripherals, software, and service at a competitive price. ■

Wake up your Dragon — using animation

Keith and Steven Brain introduce animation and just fail to win the Olympics in this extract from their latest book, "Advanced sound and graphics".

THE NEXT STEP on from simply moving things around the screen is to animate a design—that is move parts of it to give the impression that it is "alive". This article looks at a GET/PUT approach to producing the effect of a figure running. First we designed two alternative figures, the first showing a stationary figure facing forwards, and the second a running figure facing to the right.

The co-ordinates are in DATA statements and PSET in arrays, but there are really two alternative sets of co-ordinates. The first 35 points (on line 5020) make up one figure (stationary), and points 36 to 58 (on line 5030) the other (running). Only two arrays need be used as we can take any points from an array at any time and do not have to start from the beginning of the DATA each time. Subroutines to GET each figure are in lines 1800 and 2000.

If you trace the order of the DATA points and then watch this program in operation you will see that the simple animation effect is achieved because the leg points are SET relatively slowly and in a particular sequence so that one leg appears before the other. There is no point in converting these SET points to the equivalent CHR\$ as the increase in speed would mask the effect of movement here.

The sequence of operation is as follows. The title is printed and if no key is pressed then the first figure is displayed by the subroutine at 1000. If a key is pressed the program drops through to 120 which updates the screen offset (X0), clears the old picture, goes to the subroutine to SET the second figure (2000), clears to screen again, and repeats the title (see listing 1).

An alternative to CLS0 is to use a single 160 character string (BLS) to erase only the top of the screen (PRINT positions 0 to 181).

```
40 BLS = STRING$(192,100)
100 X0 = 30 + 1:PRINT @BLS:
  GOSUB
2000 :PRINT @0,BLS: GOTO 110
```

The runner described above appeared to move because of the slowness of SET and RESET and it is also possible to use the techniques described for these with PSET and PRESET in hi-res. However, you can produce much smoother animation in hi-res if you use GET and PUT, although of course you still need to make the pictures to GET and PUT first. Two "frames" for the movement of a sprinter

can be formed by PSETting the co-ordinates given in the DATA statements, as shown in listing 2.

Once the two frames have been PSET (a very slow job, but at least it only has to be done once!) you can GET them into arrays P1 and P2, and PUT,8 slowly the figures you just PSET ready for the animated sequence:

```
70 DIM P1(58): DIM P2(58)
120 GET(5,0) = (30,27):P1,0
130 GET(55,8) = (60,27):P2,0
140 PUT,8
```

The simplest sequence is to PSET each array in turn so that the figure runs on the spot half way down the left-hand side of the screen:

```
180 PUT(X,0) = (X + 25,127):P1,
  PSET
200 PUT(X,0) = (X + 25,127):P2,
  PSET
220 GOTO 180
```

If you now arrange to increment X in a FOR...NEXT loop to run across the screen from left to right, notice that each frame is shown at each X step before X is updated:

```
180 FOR X = 1 TO 230 STEP 5
200 NEXT X
220 GOTO 140
```

He moves very smoothly and quite rapidly across the screen, but what happens if there is a visible background behind him? Add in some horizontal lines to give a test background and RUN again.

```
150 FOR L = 1 TO 50 STEP 5
  LINE(0,L) = (255,0):PSET: NEXT L
```

However, the lines vanish as the man runs over them, which is not much use in a real program.

We could GET the background just before we PUT the figure and then PUT the background back when it moved on. We only GET the background once for both frames as it is the original background we need to PUT back. If we just recreate the background with PSET then the



Another sprinter with GET and PUT



```

10 GOSUB 5000
20 CLS#
30 XO=2:YO=0:C=2
100 PRINT @256;"RUNNER"
110 IF PEEK(327)=255 THEN GOSUB
1000:GOTO 110
120 XO=XO+1:CLS#GOSUB 2000:CLS#
:GOTO 100
1000 FOR N=1 TO 35:SET(XXN)+XO,Y
(XN)+YO,C:NEXT N:RETURN
2000 FOR N=36 TO 59:SET(XXN)+XO,
Y(N)+YO,C:(NEXT N: SOUND1,1: RETURN
N
5000 DIM X(59),Y(59)
5010 FOR N=1 TO 59:READ XX(N),Y(N)
:NEXT N:RETURN
5020 DATA 1,1,2,1,3,1,1,2,2,2,3,
2,2,3,0,4,1,4,4,4,3,4,4,4,0,5,1,
5,2,5,3,5,4,5,0,6,1,6,2,6,3,6,4,
6,1,7,2,7,3,7,1,8,3,8,1,9,3,9,1,
10,3,10,0,11,1,11,3,11,4,11
5030 DATA 1,1,1,2,2,1,3,2,1,3,1,
4,1,5,1,6,1,7,2,4,2,5,2,6,2,7,3,
5,1,6,2,6,3,6,3,9,3,10,4,10,1,9,
0,9,-1,9,-1,10

```



Using 1 - stationary and running figure

4. lines reappear, but with flashing and whilst each frame of the figure is shown part of the lines are erased.

```

70 DIM F(20):DIM F2(20):DIM B(20)
170 SET(1,5) = (X+25,27),B(0,0)
210 PUT(X,0) = (X+25,21),B(0),F(0)

```

To get a smoother replacement of the background (fig 157) we need to make things a little more complicated, and apply some logical actions in our PUT commands:

```
180 PUT(X,0) = (X+25,27),F,OR
```

```

180 PUT(X,0) = (X+25,27),B(0),AND
200 PUT(X,0) = (X+25,27),F2,OR
210 PUT(X,0) = (X+25,27),B(0),AND

```

First we PUT the first frame (F(0)) over the background (B(0)) with OR. This gives background plus frame 1 as all points which are set in either array OR screen are set. Now we PUT back the background (B(0)) with AND so that only points which are common to both the current screen and the original screen remain set. This produces the original position and we can

```

10 DATA 4,8,5,0,6,0,7,0,4,1,5,1,
6,1,7,1,4,2,5,2,6,2,7,2,4,3,5,3,
6,3,7,3,4,4,5,4,6,4,7,4,5,5,6,5,
4,6,5,6,6,6,7,6,4,7,5,7,7,7,3,6,
4,6,7,6,2,9,3,9,4,9,7,9,2,10,4,1
6,7,10,8,10,9,10,10,10,11,10,1,1
1,2,11,4,11,7,11,8,11,9,11,10,11
,11,11,12,11,12,12,3,12
20 DATA 4,12,5,12,6,12,7,12,3,13
,4,13,5,13,6,13,7,13,4,14,7,14,4
,15,5,15,6,15,7,15,4,16,5,16,6,1
6,7,16,4,17,5,17,6,17,7,17,8,17,
9,17,10,17,4,18,5,18,6,18,7,18,8
,18,9,18,10,18,5,19,6,19,10,19,1
1,19,5,20,6,20,10,20,11,20,5,21,
6,21,10,21,11,21,5,22,6,2
30 DATA 10,22,11,22,12,22,13,22,
5,23,6,23,10,23,11,23,12,23,13,2
3,5,24,6,24,5,25,6,25,5,26,6,26,
7,26,8,26,5,27,6,27,7,27,8,27
40 DATA 55,0,56,0,57,0,58,0,55,1
,56,1,57,1,58,1,55,2,56,2,57,2,5
8,2,55,3,56,3,57,3,58,3,55,4,56,4
,57,4,58,4,55,5,57,5,58,5,56,6,
57,6,58,6,55,7,57,7,58,7,54,8,55
,8,57,8,58,8,53,9,54,9,55,9,57,9
,58,9,53,10,55,10,57,10,58,10,59
,10,60,10,61,10,62,10
50 DATA 52,11,53,11,55,11,57,11,
58,11,59,11,60,11,61,11,62,11,63
,11,53,12,54,12,55,12,56,12,54,1
3,55,13,56,13,55,14,54,14,55,15,
56,15,57,15,59,15,55,16,56,16,57
,16,58,16,55,17,56,17,57,17,59,1
7,55,18,56,18,57,18,59,19,59,19,
56,19,57,19,58,19,60,19
60 DATA 56,20,57,20,60,20,61,20,
56,21,57,21,61,21,62,21,61,22,52
,22,53,22,54,22,55,22,56,22,57,2
2,61,22,62,22,51,23,52,23,53,23,
54,23,55,23,56,23,57,23,61,23,62
,23,51,24,52,24,61,24,62,24,51,2
5,52,25,61,25,62,25,63,25,64,25,
61,26,62,26,63,26,64,26
80 PROC 4,1:SCREEN1,0:PCLS
90 FOR N=1 TO 249
100 READ X,Y:PSET(X+10,Y)
110 NEXT N

```

Using 2 - smoother animation for sprinting

then PUT the second frame (F2) with OR and then AND this with the background (B(0)) as for frame 1. Notice that it is essential to PUT the background back between frames if you are to avoid problems with the International Athletics Association over three-legged sprinters.

The only real disadvantages of GET and PUT animation are that you cannot change the scale, colour or angle of your design. DRAW will allow you to change these factors, but as it is slower than GET and



PUT it is only useful for some applications, and new designs are best produced on graphics pages which are out of sight, and then PCOPYfed back to the current screen. As an example we will look at producing an oasis in the desert which gets bigger as you approach it.

First we need, to PCLearN, all eight graphics pages and PCL5 the first four to yellow (colour 2) to represent the sand.
10 PCLearN: PMODE 3.1: SCREEN
1.3: PCL52

The quickest way to set the top half of the screen to blue for the sky is to change the PMODE to 1 (which only uses two pages) and PCL5 to 3. Remember that as there is no SCREEN command you are still looking at PMODE 3. Now we change the PMODE back to 3 and make a painted circle for the sun.

20 PMODE 1.1: PCL5 3: PMODE 3.1: O
PCL5 (300,30),20.2: PAINT(200,30),
2.2

In each picture the oasis is built up on a hidden screen on pages 5 to 8. PCL5 2 in PMODE 3 gets this, to yellow, and then PCL5 3 in PMODE 1 makes the top half blue.

30 PMODE 3.5: PCL52: PMODE 1.3:
PCL53: PMODE 3.5

The actual oasis is produced with DRAW and PAINT.

40 AS = "C11LGER2FHLMHDC4": BS
= "B8H 26.110038M - 5. +
GFR166L138H - 5. + 0": PT3 =
"C4USXAG58H - 4. + 504XAG58M -
5. + 4USC1KAS":
50 DRAW BS: PAINT(125,111),3.3: DR
AW PT3

To see the oasis on the screen we must PCOPY the last three pages of the hidden screen on to the last three pages of the screen on display. As the top page does not change there is no point copying this:

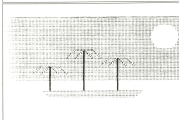
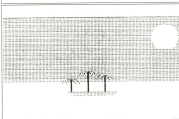
70 PCOPY 6 TO 2: PCOPY 7 TO 3:
PCOPY 8 TO 4
80 SOUND(5) + 5.1
90 GOTO 90

If you RUN this you will see a minute oasis in the far distance (fig 158), but if you add an increasing scale factor (S) it will increase rapidly in size.

30 FOR S = 4 TO 48 STEP 4: DRAW "S"
+ STR\$(S)
90 NEXT S

Of course mirages are very common in the desert so you shouldn't be too surprised when your head starts to spin and the oasis vanishes into the distance again:

130 FOR A = 0 TO 3: PMODE 3.1:
PCL52: PMODE 1.3: PCL53:
PMODE 3.5: DRAW "A" + STR\$(A)
+ "S" + STR\$(48 - (16 - A) + WS
+ PT3
140 PCOPY 6 TO 2: PCOPY 7 TO 3:
PCOPY 8 TO 4: NEXT A
120 FOR N = 355 TO 1 STEP - 5:
SOUND N.1: NEXT N
130 RUN ■



The oasis in the desert keeps getting bigger as you get nearer



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Robin Talkman offers his assistance if you're struggling with disassembly.

THIS PROGRAM CONVERTS machine code into an assembly type mnemonic list giving decimal, hex address, machine code and mnemonic. It consists of a FOR-NEXT loop for the memory address, another which it pits out the opcode and length/format using rather a lot of IF-THEN-ELSE statements. Due to the complexity of 6809 language (the chip on which the Dragon is based) a simple instruction table will not work.

The program asks you for start address, end address, number of data fields and program name. It then immediately lists all the instructions to either the screen or printer depending on whether you entered 0 or 1 initially. If you don't enter zero for the number of data fields it will ask for the start address of each data field. When it comes to those addresses it will then ask which format the data is to be printed in and it

† *and* ‡ indicate statistically significant differences in the two populations for the stated parameter and statistic. *NS* indicates no significant difference.

[illegible]

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Lines 29-80 input the parameters. Line 100 sets up FOR-NEXT loop. Lines 120-190 load M05 and L06 with the M05 and L06 of the two data and convert it to a decimal value (N) on which it goes to its subroutines to identify the opcode. If, when it returns, A05 (address 0) is null it chops the M06 (two data 0) to one byte and prints DATA. The opcode length is that added to the index (I) less one before computing the base.

Line 172 is the joint subrouting. Lines 180-200, 210-230, 240-260, 270-290, 300-310, 320-340, 350.

300, 400-410, 420-430, 440-450, 460-480,
500-510, 520-530, 540-550, 560-580, 590,
600 and 610 are the subunits for the
MSPB of the parasite.

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Lines 360-365 are the subroutines for naming branch instructions. Lines 630-640, 670-680, 730-735, 830-840, 950-960 and 970-980 do the same for other repetitive instructions.

Lines 850-880 read memory into the address 16 in hexadecimal index. Lines 880-

[illegible][illegible]

Add a new dimension to your Dragon

*If you fancy links with the outside world,
Leslie Miles shows how to build an inexpensive interface.*

THERE ARE PROBABLY many Dragon owners who think that their machines should be capable of doing more than just display pretty pictures, and who want to experiment by interfacing with other types of displays and external devices. In fact, the Dragon is able to drive LEDs, motors, relays, etc. read input levels, and indeed perform any type of control function. The capabilities of the machine are virtually only limited by one's own ingenuity.

To achieve this extra terrestrial activity, as it were, the only requirement is an interface board to convert the signals from the Dragon data bus into electrical signals capable of operating any other electrical device. Anyone with a soldering iron and the will to spend a little time and trouble on making a good job of a small board, whether it be etched or put on a piece of 'repotboard', can build such an interface for an outlay of £5 or so. Since there are so many variations on this theme, I can only describe the method in principle and leave the actual application to the individual's own requirements.



Figure 1: pin connections of the MC68017

The heart of the interface is the Peripheral Interface Adapter chip (fashionably known as the PIA). Two of these are already built into the Dragon, one to input the keyboard information and the other to interface the cassette port. The joystick ports and sound output port are also serviced by these two built-in chips.

'The capabilities of the machine are virtually only limited by one's own ingenuity'

The PIA itself is a device that can be addressed by a unique address so that it is activated (or enabled). Being already connected to the computer data bus, it can have 8-bit data read into its registers for supplying signals to output devices, or have data in its registers read back into the computer. The CPU (central processing unit) in the computer generates the necessary R/W (read/write) signal on command from Basic to read from or write into the PIA. The PIA also has control lines that can be programmed to act as interrupt signals to inform the CPU that a change in the external circumstances has occurred or can be used as additional output lines.

The PIA that I shall use is the same as is in the Dragon, the Motorola MC68017, which has two completely independent 8-bit input/output ports, any one of which can be programmed to act as an input or an output at all. A complete description of the 68017 would fill an article in itself and I would strongly advise anyone contemplating using the device to obtain information from Motorola to be able to appreciate its full potential. The company can be contacted at 17 Burnley Road, London NW11. The 68017 is advertised by Technomatic at less than £2.50.

Basically the 68017 contains two control registers, CRA and CRB, one for each port, two data direction registers, DDRA and DDRB, which determine which of the port lines PA0-PA7 and PB0-PB7 are set as inputs or outputs and two output registers, ORA and ORB, which hold the output information. There are four control lines, CA1, CA2, CB1 and CB2, which can be programmed as either interrupt lines or

in the case of CA2 and CB2 as additional output lines, depending on how the appropriate bits in the control registers are set.

The PIA is addressed by means of signals on lines CS0, CS1, CS2, PB0 and PB1. The chip is enabled when CS0 and CS1 are high and CS2 is low at the same time and the registers inside the chip are addressed by the state of PB0 and PB1. Lines RW, \bar{A} and \bar{B} are CPU controlled signals that determine whether a read into or write from the chip is required, supply the clock signal and supply a reset signal respectively. Data is fed to and from the PIA via DQA/07 and interrupt signals into the CPU via IRQA and IRQB. The pin connections are shown in Figure 1.

The link between the Dragon and the PIA is made via the expansion socket on the right-hand side of the console. This socket is a 20-way connector that will accept a double-sided PCB on 0.1 inch spacing. The pin connections are shown in Figure 2. Making a suitable connector for the socket is probably the most expensive item in building the interface board. I used an RS Components 49-way edge plug cut down to 20-way. It costs about £5.50 and its part number is 499-709. This item accepts a single-sided PCB board, the terminations being soldered directly to the copper tracks on one side and by wire links on the other. No doubt experimenters will devise their own method of making a connector to the expansion socket but I must stress that it is important to make a good connection and to check thoroughly that there are no shorts between any of the adjacent terminals because the result could be a screen full of garbage. The circuit joining the Dragon to the interface board is shown in Figure 3.

As stated before CS0 and CS1 must be high (not less than 2 volts) and CS2 must be low (0.5 volts at most) to access

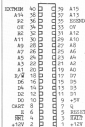


Figure 2: pin connections of expansion socket

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Address

■ the PIA. With the design shown, and this is purely arbitrary, address line A13 is high, A14 and A15 are both high at the input to the 'A' gate so that the output of the 'A' gate is also high and A12 is low. This will correspond to an address with a high order byte of binary 1110 so any hexadecimal address that begins with a 'E' will switch the PIA on.

The two lowest bits of the address are connected to the register select lines and signals on these address bits will access the registers as shown in figure 4.

So if address \$HE000 is put on the address lines by the CPU then either register CR0 or DR0A is connected to the data bus, depending how bit 0 in control register CR0 has (previously been set. Similarly \$HE001 will address CR0 and

addresses \$HE002 and \$HE003 will address the equivalent registers in section B of the PIA.

It might well be that you have an application that requires more than two ports. Another PIA may be added by using the extra logic shown in figure 5. We now have a situation where \$HE000 will address one PIA and \$HE004 will address the other. It is possible to go on like this for as many ports as required always provided that the lines from the expansion socket are suitably buffered against overloading.

You will note that the addresses I have used in the examples, namely \$0040 to \$0041 and \$7040 to \$7041 (quoted now in decimal, are in the cartridge memory space and will have no effect on any other

location in the Dragon's memory map.

So much for the link between the Dragon and the external devices. How do we use this interface? I will give a simple example of what can be done and how a program may be written to control the input and output ports, and then you are on your own.

The PIA lines PA0 to PA7 have pull-up resistors to +5 volts. Therefore, by connecting a bank of switches to these lines and putting the other side to 0 volts, it is possible to put a high or a low on these lines at will. Instead of using the interrupt outputs (IRQA or IRQB) I will make use of one of the control lines CA1 to produce an interrupt indication. For this a momentary push-button switch is connected to pin 40 with a pull-up resistor to +5 volts so ■

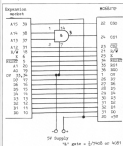


Figure 3: connections between the expansion socket and the PIA.

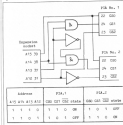


Figure 5: connections for two PIAs.

Bit 0	Bit 1	CA0, bit 0	CA1, bit 0	Register selected
0	0	1	x	Output register A
0	0	0	x	Data direction register A
0	1	x	x	Control register A
1	0	x	x	Output register B
1	0	x	0	Data direction register
1	1	x	x	Control register B

x = either 0 or 1

Figure 4: internal addressing of PIA registers

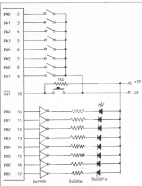


Figure 6: test circuit on output of PIA

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■ CA1 is high but can be pulled low by operating the switch. Lines P00 and P07 are connected to LEDs via current limiting resistors. These will act as indicators to read out the results of the program. The circuit for the ports is shown in figure 5. I will explain the programming of the PIA as we go through each step.

A word of warning here: carefully check all the wiring for shorts, especially between the IC pins. Use a magnifying glass and then if you are not sure use a continuity tester. Also make sure that the Dragon is switched off before connecting anything into the expansion socket. When the interface is connected to the Dragon, switch both units on — if all is well you should be rewarded by seeing all 8 LEDs light up.

Now for the program.

10 P= 57544

Variable P is set to the base address of the PIA.

20 PORE P+255

When the PIA is first switched on all the registers are set to 0 (a reset also sets all bits to 0). We are addressing DORA and in order to make the port lines act as inputs take the bits in the data direction registers must be set to a '1' (255 = &HFF = 11111111).

30 PORE P+3

A '1' is written into bit 2 of CDR (remember that the lowest bit is bit 0) which switches address P+2 to CDR.

40 PORE P+15

A '1' is written into bits 0 and 2 of CDR.

This does two things: the '1' in bit 2 switches address P to CDR as line 30 did for section 8, and the '1' in bit 0 enables and sets line CA1 as an interrupt input. If CA1 is now momentarily made low then bit 7 of CDR is set high. (There is a lot more associated with the control register bits not covered here.)

50 Q=PEEK (P+1)

Q is read and the bit pattern stored as variable Q.

60 R=PEEK (P)

Similarly Q is stored as variable R.

70 IF Q=128 THEN PORE P+2

"There really is no limit to the possibilities . . . There are so many devices available on the market"

If an interrupt has occurred, is it CA1 switch has been operated once, there will be a '1' in bit 7 as well as the '1's put in by line 40. So Q would have contained 128 when line 80 read it. I say "would have" because when line 80 reads the output register it automatically clears bit 7 back to 0 ready for another interrupt. R now contains the setting as for the switches on the input port, and if the condition is met this setting is put into CDR and the LEDs if accordingly. However, if no interrupt has

occurred then line 70 is ignored.

80 GOTO 50

This puts the program in and endless loop. The appropriate LEDs will remain lit until such time that the port switches are changed but the new setting will only be reflected in the LEDs when switch CA1 is operated.

This simple program demonstrates how input levels on the input port lines are translated into output levels on another port. As there is a computer between these two ports then all sorts of conditions may be built in. For example, maybe you only want US0-2 to light up when the switches are set to a bit setting of, say, 11001100. Again FOR . . . NEXT delay loops may be built into the program to make LEDs flash on and off. There really is no limit to the possibilities. You may want to read inputs from a remote infrared transmitter to drive a logic-controlled tape recorder. The LEDs may be replaced by transistors that drive power devices like relays.

Maybe you want to run a robot or some process from a computer program. Then all you have to do is to provide enough 8-bit output ports, write your program and away you go. There are so many devices available on the market that no-one should be hung up for a suitable part for his own application. With programmable D-to-A devices the digital outputs may be converted into varying DC levels, and drive solenoids, or control motor speeds, or any other such analogue device. ■

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```

10  DECLARE @L1 VARCHAR(100), @L2 VARCHAR(100)
20  SET @L1='ABCDEF', @L2='GHIJKL'
30  SET @L1=REVERSE(@L1), @L2=REVERSE(@L2)
40  DECLARE @L3 VARCHAR(100), @L4 VARCHAR(100)
50  SET @L3=@L1+@L2, @L4=@L2+@L1
60  SET @L3=REVERSE(@L3), @L4=REVERSE(@L4)
70  SELECT @L3, @L4

```

The main game movements are controlled between lines 228-230. Rebound directions are present in lines 240-250. If the game is stopped by pressing the BREAK key for any reason then be sure to press the GO GO! button before using any

[illegible]

```

290 HH=PC-DC:RETURN
300 AO=O:AO=O:AO=O:AO=O:AO=O:AO=O:AO=O:AO=O:AO=O
310 BS=O:RI=O:RI=O:RI=O:RI=O:RI=O:RI=O:RI=O:RI=O
320 CC=O:CC=O:CC=O:CC=O:CC=O:CC=O:CC=O:CC=O:CC=O
330 DI=O:DI=O:DI=O
340 HA(1)=O:HA(2)=O:SC(1)=O:SC(2)=O:S=O:W=O:Z(1)=O
350 PO=O:FFO7,0:'SET HIGH SPEED
360 CLS
370 PRINT:GOTO 10,"RELOAD"
380 PRINT:GOTO 5,"TO PLAY THIS GAME YOU WILL NEED BOTH JOYSTICKS"
390 PRINT:GOTO 5,"EACH GAME IS SCORED TO 11 THE FIRST TO SCORE 11 WINS GAME"
400 PRINT:GOTO 10+32,":::INPUT NAME OF RH PLAYER:::"
410 PRINT:GOTO 12+32,":::INPUT NAME OF LH PLAYER:::"
420 GOSUB 700
430 IF SC(1)=11 THEN HA(1)=HA(1)+1
440 IF SC(2)=11 THEN HA(2)=HA(2)+1
450 GOSUB 370
460 GOTO 420
470 ' START
480 FL=0
490 FOR I=0 TO 3:JO(I)=JOYST(I):NEXT
500 IF S=0 THEN 540
510 BP(1)=(INT(JO(1)/4)*32)+(INT(JO(1)/2))
520 PC=BP(1)+1
530 RETURN
540 BP(2)=(INT(JO(3)/4)*32)+(INT(JO(3)/2))
550 PC=BP(2)+1
560 RETURN
570 ' SCOREBOARD ROUTINE
580 CLS
590 PRINT:GOTO 5,"SCOREBOARD"
600 PRINT:GOTO 5,HH:PRINT:GOTO 22,LH
610 PRINT:GOTO 5,HA(1)=PC:GOTO 5,HA(2)=PC,"GAME::PRINT:GOTO 22,HA(2)
620 PRINT:GOTO 12,"PRINT"
630 PRINT:GOTO 5,SC(1)=PC:GOTO 22,SC(2)
640 PRINT:GOTO 12,"GAME"
650 PRINT:GOTO 5,"PRESS BUTTON TO CONTINUE"
660 FOR I=0 TO 3:FOR J=O TO 15:FOR K=O TO 15:GOTO 12,20:NEXT
670 FOR I=0 TO 15:FOR J=O TO 15:FOR K=O TO 15:GOTO 12,20:NEXT
680 PO=PO+O:GOTO 12
690 IF PO=120 OR PO=204 OR PO=120 OR PO=204 THEN RETURN GOTO 690
700 ' START GAME
710 CLS
720 PRINT:GOTO 5,"START GAME::PO=O:PO=O:PO=O"
730 IF O=O THEN 720
740 IF O=O THEN 720
750 ON S GOTO 760,770
760 PRINT:GOTO 5,HA(1)=PC:GOTO 22
770 PRINT:GOTO 5,LH
780 PRINT:GOTO 5,"PRESS BUTTON"
790 GOTO 420
800 GOTO 470
810 CLS:DI=O:GOTO 20
820 IF S=1 THEN SC(1)=SC(1)+1
830 IF S=2 THEN SC(2)=SC(2)+1
840 IF SC(1)=11 OR SC(2)=11 THEN RETURN
850 CLS:GOTO 750
860 GOTO 570
870 CLS
880 IF HA(1)=HA(2) THEN PRINT:GOTO 5,HH HAS WON::GOTO 910
890 IF HA(1)=HA(2) THEN PRINT:GOTO 5,"MATCH DRAW::GOTO 910
900 PRINT:GOTO 5,LH HAS WON::
910 PRINT:GOTO 5,"MATCH FINISHED"
920 FOR I=0 TO 1000:NEXT
930 PO=O:FFO7,0:'RESET SPEED
940 END

```

Pontoon

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

THIS PROGRAM is a game for one player against the computer. The idea is to get 21 or as near to 21 as possible. Should the total score of your cards beat the total score of the computer's cards you are awarded a point; vice versa should the computer's total beat yours. Should you beat or tie total enough the computer's

the computer wins. The player is allowed a maximum of five cards; the computer is allowed only two and therefore cannot bust.

The game is simple to operate and the graphics are used to display the cards. One card from both the player's hand and the computer's hand is shown. Another card only from the player's hand is then revealed. The player is asked whether he would like another card, if yes in the answer another card is revealed. [Should he refuse to take a card and he hasn't bust, the other card from the computer's

board is revealed. The winner obtains a point while a cardmark appears on the board. The scores from both parties is then displayed on the screen and the player is asked whether or not he would like another game.

An **win** displayed is equal to 11 not one or 11. Another point worth mentioning is the fact that the game is speeded up using the command **POKE 68495,0**. It is advisable not to break the game but wait until you are asked **ANOTHER GAME (Y/N)** as the **POKE** will stop the cassette recorder recording.

[illegible]

[illegible]

From David Horton in Peterborough
YOU MAY HAVE played Maddington's
game YATZIE with five dice, got and
passed money on the television.

plays it. Then the next player's action depends on the outcome.

14251-14301	Physical objects, materials, objects.
-------------	---------------------------------------

[illegible]

Keywords: child sexual abuse; disclosure; social support

```

350 FOR P#US#1 TO 2555: NEXT=GETC(0)
360 '*****SAVE ROUTINE*****
370 FOR B#1 TO 5
380 IF B<0 THEN PRINT "  DICE "/B/ " saved":B#1 ELSE PRINT "  DICE "/B/ " SPWE
  Y"/B/":INPUT B#1
390 IF B#1 THEN B#1+1:IF B#1=0 THEN B#1
400 NEXT B:RETURN
410 IF AC2=0 AND BCL2<PL2 THEN BCL2<PL2=0
420 '*****DISPLAY SAVED ROUTINE
430 CLR
440 PRINT:FOR L#1 TO 5:IF BCL L=0 THEN PRINT "  DICE "/L/ " saved "/B#1 L ELSE PRINT "
  DICE "/L/ " not saved":L#1+1:IF L#1=5 THEN L#1=1
450 NEXT L:FOR P#US#1 TO 2555: NEXT=RETURN
460 '*****SAVE ROUTINE*****
470 FOR US#1 TO 5
480 IF B1 US=0 THEN PRINT "  DICE "/US/ " not saved":US#1+1:IF US#1=5 THEN US#1=1
  "US/":INPUT US#1:IF US#1=0 THEN US#1
490 IF US#1 THEN US#1+1:IF US#1=5 THEN US#1=1
500 NEXT US
510 FOR P#US#1 TO 2555: NEXT=CLR
520 RETURN
530 '*****SCORING*****
540 FOR SC#1 TO 5:IF B1 SC=0 THEN LET B1 SC=0:IF B1 SC
550 NEXT SC
560 LET SCORE=B1 SC+B1 SC2+B1 SC3+B1 SC4+B1 SC5
570 '*****DICE COUNT*****
580 FOR T#1 TO 5
590 IF B1 T=0 THEN B1 T=0+1
600 IF B1 T=1 THEN B1 T=1+1
610 IF B1 T=2 THEN B1 T=2+1
620 IF B1 T=3 THEN B1 T=3+1
630 IF B1 T=4 THEN B1 T=4+1
640 IF B1 T=5 THEN B1 T=5+1
650 NEXT T
660 '*****PRINT DICE*****
670 FOR T#1 TO 5
680 IF B1 T=0 THEN B1 T<1:IF B1 T=1 THEN B1 T<2:IF B1 T=2 THEN B1 T<3:IF B1 T=3 THEN B1 T<4:IF B1 T=4 THEN B1 T<5:IF B1 T=5 THEN B1 T<6
690 IF B1 T=0 THEN B1 T<1:IF B1 T=1 THEN B1 T<2:IF B1 T=2 THEN B1 T<3:IF B1 T=3 THEN B1 T<4:IF B1 T=4 THEN B1 T<5:IF B1 T=5 THEN B1 T<6
700 NEXT T
710 '*****HIGH STRAIGHT*****
720 IF B1 T=0 THEN B1 T=0
730 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
740 '*****LOW STRAIGHT*****
750 IF B1 T=0 THEN B1 T=0
760 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
770 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
780 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
790 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
800 IF B1 T=1 THEN B1 T=1:IF B1 T=2 THEN B1 T=2:IF B1 T=3 THEN B1 T=3:IF B1 T=4 THEN B1 T=4:IF B1 T=5 THEN B1 T=5
810 FOR P#1 TO 5
820 IF AC1=0 AND BCL1<PL1 THEN BCL1<PL1=0:IF BCL1<PL1 THEN BCL1<PL1=0
830 NEXT P
840 '*****FOUR OF A KIND*****
850 IF B1 T=0 THEN B1 T=0
860 FOR P#1 TO 5
870 IF B1 P=0 AND BCL P<PL P THEN BCL P<PL P=0:IF BCL P<PL P THEN BCL P<PL P=0
880 NEXT P
890 '*****FULL HOUSE*****
900 IF B1 T=0 THEN B1 T=0
910 FOR P#1 TO 5
920 FOR P#1 TO 5
930 IF B1 P=0 AND BCL P<PL P THEN BCL P<PL P=0:IF BCL P<PL P THEN BCL P<PL P=0
940 NEXT P: NEXT P
950 '*****THREE OF A KIND*****
960 IF B1 T=0 THEN B1 T=0
970 FOR P#1 TO 5
980 IF AC1=0 AND BCL1<PL1 THEN BCL1<PL1=0:IF BCL1<PL1 THEN BCL1<PL1=0
990 NEXT P

```

[illegible]

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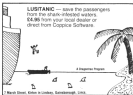
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Tip for a beginner

I PURCHASED a Dragon 32 last month. I have no computer knowledge other than that I have picked up since then.

The question I wish to ask concerns the memory of the Dragon 32. When I enter PRINT MEND, I get the display of "24571" bytes. Should this not be 32768 or 32 - 1024 bytes?

I have tried this function several times and always get back the same display. I have made sure that there is no program in the computer before calling up the memory. I have also tried to switch off the computer for about 10 seconds before calling up the memory.

As I stated this is my first computer and I have little knowledge up to all the various functions. In the circumstances would you please be so kind as to let me know if the computer is functioning as it should, or do I have a defect?

*D J Pountney,
Croydon,
Surrey*

THE DRAGON 32, as advertised, does have 32K of dynamic RAM. However, some of this memory is taken up by graphics pages, etc. The breakdown is as follows: 1K for cassette buffers and basic pointers; 1K4 taken by text screen; 500 bytes for string storage; and 17 bytes — stack.

The maximum memory available to users if you do not need graphics pages is 30815 bytes. To obtain this enter the following POKE:

POKE 32,0
POKE 40960,0

Then type MEND and you will have 31075 bytes available.

POKE problems

IN YOUR reply to the letter from B. Hagan (May) about POKEING \$6400,0 you say you do not recommend this. POKE as it makes the Dragon work out of design specification, but on page 45 of that issue there is a program with the same POKE. On one hand you don't recommend it, but on the other you do.

I am asking you this as my machine also seems to crash at



this speed. I also purchased a flight simulator program with the line POKE \$4000,0 which does the same thing and that also seems to go wrong after a while.

Please could you say whether my Dragon is faulty. This is my second machine (the first had a fault), and if it is faulty then I would like to get something done about it before the guarantee runs out.

*I J Jennings,
Canterbury*

Numerous other readers have written in asking about the POKE \$6400,0 or its less-than-ideal equivalent POKE \$4000,0. The Dragon 32 has been designed to run at a certain speed, 1.8M MHz, and this POKE causes it to run at double speed. Therefore the machine is running out of specification and may crash.

If your machine does crash it is not faulty, it is still performing to its advertised specification, but no further.

Any readers approved that their Dragons will not accept the speed-up POKE should consider that improvements to guarantee a faster level of performance would increase costs and still lead to users discovering other ways of increasing speed. Again these discoveries would be unlikely to apply to all machines.

The POKE does work on a number of Dragon 32s which is the reason it is included in listings in this magazine. Software houses, however, are misleading users if they do not mention that their programs contain the POKE. Such programs cannot be guaranteed to work on all machines.

The POKE is unlikely to damage your machine but I'm afraid no research has yet been done on this subject.

Auto-run on Dragon

I WOULD like to know if it is possible to make programs which I have keyed in, auto-run upon loading.

I know how to do this on two other computers but it is not mentioned in the Dragon Manual.

*Paul Hargreave,
Leamington Spa,
Warwickshire*

THERE IS no simple way to make Basic programs auto-run on loading as there is no facility for this built in the Basic used on the Dragon.

However, it should be possible to obtain auto-run using machine code. One method of achieving this is to save a "dummy" program, containing a jump to CLEARM or similar, previous to the program you wish to auto-run.

When this "dummy" program loads it overrides the interrupt vector and control is then transferred to the jump routine so that the program following will load and execute automatically.

Crystal change

IN DRAGON User of June 1983 an article comparing the Dragon 32 and the Lady Colour Computer mentioned that the external oscillator of the early Dragons was run at 14.31810 MHz but that in later machines this had been changed to 14.318 MHz "to improve picture quality".

Could you tell me into which category my Dragon falls and, if of the earlier design, is it possible

to change the crystal, what is the exact frequency of the new crystal and is it possible to do this at home (once out of guarantee)? I have some electronics experience.

My Dragon was bought from the Wycombe factory on August 16 1982 and its serial number is 800327 DB.

*Simon Miles,
Aylesbury,
Oxford*

IT IS not possible to tell from a serial number what exact specification you have inside your machine as serial numbers do not necessarily run consecutively.

The crystal change mentioned in an earlier issue of this magazine does not necessarily improve the quality of the display and it would not be worthwhile carrying out the alteration as it would invalidate the warranty with no guarantee of improved display.

Club information

SOME SIX to seven weeks ago I returned the guarantee card which was part of the package of my Dragon 32 computer. Since returning the guarantee card I have heard nothing. As I believed that I was entitled to one year's free membership of the Dragon Users Club I expected to receive, at the very least, confirmation of my membership.

Could you please, therefore, either send me any information from the club or inform me that I was under a misapprehension about membership becoming automatic on return of the guarantee card?

*I Foster,
Warrington*

I HAVE had quite a few inquiries about the Dragon newsletter directed to Dragon User and I should like to take this opportunity to point out that Dragon User is an independent magazine and is not connected in any way with Dragon Data's official newsletter *Dragon Press*.

Dragon Press is released approximately every six weeks and the mailing list updated before each release. Therefore, if your warranty card is returned about the same time as a *Dragon Press* release your details will not go onto the mailing list until just previous to the next issue.

Competition Corner

Answers to Competition Corner,
Dragon User, 12/13 Little Newport
Street, London WC2R 3LD

Win a Supertalker—on a roll of the dice!

Test your skill—or your luck—on this puzzle by Gordon Lee.

Prizes

THIS MONTH'S PRIZE is a speech synthesis package consisting of the Ramtel Supertalker from DRG Business Machines and an RS232 interface from Commodore Computers. The Supertalker has an onboard CPROM containing over 550 commonly used words, including many suffixes and prefixes, allowing over 2,000 different words to be made. A further 2K of RAM is available to the user to extend the onboard dictionary by 200-250 words. The Supertalker can also be programmed directly using phonemes.

The RS232 interface is needed to connect your Dragon to the Supertalker. The interface is designed to allow the Dragon to transmit and receive data from RS232 compatible devices. It uses the standard 25-way D-type connection, incorporating additional lines to allow control of modems for transmitting data and test over the telephone network.

Rules

TO WIN THE Supertalker plus RS232 interface, you have to send in the most elegant solution to the puzzle. You must

show both the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon 32. As a tie-breaker, complete the following sentence in 15 words or less: I want to add speech synthesis to my Dragon 32 in order to:

Your entry must arrive at Dragon User by the last working day in September 1983. The name of the winner, and the solution to the puzzle, will be printed in the November issue of Dragon User. You may only enter the competition once. Entries will not be acknowledged and we cannot enter into correspondence on the final result. Please send your entries to Dragon User, 12/13 Little Newport Street, London WC2R 3LD.

July winner

THE WINNER OF the July competition is Roger Latch of Farnington in Oxfordshire who will be receiving his prize of a Microgrip robot from Powertrain Electronics. The answer is that DRAGON USER is represented by the numbers 780084 and 1286.

OF THE FIVE 'Platonic' solids, probably the most familiar is the cube. Certainly its use in everyday life is far greater than any of the others, no doubt due, in part, to the cube being the only one of the Platonic solids that has faces that are both square, and also arranged at right-angles to each other.

Space doesn't permit consideration of the other four Platonic solids except to mention them. They are the tetrahedron, octahedron, and icosahedron (with, respectively, four, eight and twenty faces—each of the faces being an equilateral triangle), and the dodecahedron, which has 12 faces—each face a regular pentagon.

Returning to the cube, we shall say little more concerning its geometry, save that its shape makes it the obvious choice for a die. It is a regular solid—so each face will have an equal chance of ending up 'most', and also it has just about the right amount of 'variability'. The tetrahedron, for example, is too acute to roll well, whereas the icosahedron would roll almost as well as a ball—no doubt, during a game using dice of this type, more time would be spent retrieving them from under the table than actually playing.

Dice tricks

It is certain aspects of dice that I shall be considering here. First, here's a trick with three dice. Hand them to a friend, turn your back, and ask him to throw them on to the table. He is then to double the number of the first die and add 5, multiply this by 6 and add the value of the second die.

Finally, ask him to multiply the total by 10 and add the number on the third die. You ask him for the total and you are instantly able to give him the values on the dice. How? Simply subtract 250 from the total that he gives you and this will give you the answer.

A little problem concerning dice arose recently when I tried an experiment with Sam and Paul, two mathematician friends. Earlier, I had thrown three primary dice and had noted the scores.

I explained what I had done, and I gave them each a piece of paper, and announced that on Sam's paper I had written the sum of the numbers thrown, while on Paul's I had written the product. I added that they should keep these values secret from each other.

They both made many calculations but neither seemed able to make any headway. Then Paul said: "I can narrow it down to one of two possible sets of dice throws." There was another silence and then Sam declared: "I had reduced it to three possibilities, but now I can eliminate all but the correct answer." He was right too. What were the values that I had thrown with the three dice?



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